**Chemistry 534 BCE-NIE-Nomenclature-Intro Thermochem Friday October 20th 2017**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**All Questions 4 Marks Each**

**1.** Give the name of the formula:

A) K3PO4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B) CuI2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C) Ni(ClO3)3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D) P2S3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.** Determine the formula:

A) Magnesium sulfate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B) Hydrogen phosphide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C) Iron (2) chloride \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D) calcium acetate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**3.** Draw the Lewis dot diagram of propanol.

**4.** The following diagram shows the enthalpy involved in certain systems as a function of the progress of the reaction.



Which of the following two equations can be represented by this diagram?

1. H2O(g) → H2(g) +  O2(g) Δ*H* = +242 kJ

2. C(s) + O2(g) → CO2(g) + 394 kJ

3. H2O(l) + 47 kJ → H2O(g)

4. CH4(g) + 2O2(g) → CO2(g) + 2H2O Δ*H* = −803 kJ

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 1 and 2 | C) | 2 and 4 |
| B) | 1 and 3 | D) | 3 and 4 |

**5.** Below is a list of physical and chemical changes.

1. Sublimation of iodine crystals

2. Solidification of water

3. Combustion of a match

4. Vaporization of alcohol

Which of these changes are exothermic?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 1 and 2 | C) | 2 and 3 |
| B) | 1 and 4 | D) | 3 and 4 |

**6.** Complete and balance the following 2 chemical equations:

C4H6(g) + O2(g) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Aluminum and hydrochloric acid react to form aluminum chloride and hydrogen.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**7.** Show how the following 2 ionic compounds dissociate in water:

a) **Sr3N2­(s)** 🡪 ­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) **Ca(ClO­4)2(s)**­ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**8.** Write the net ionic equation for the following reaction:

**BCE** **MnCl2 (aq) + (NH4)2CO3 (aq) → MnCO3 (s) + 2 NH4Cl (aq)**

**IE** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**NIE** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**9.** What is the mass of a piece of iron given its specific heat capacity is 0.46 J/goC and it takes 3341.5 J to raise its temperature from 55.0 oC to 200.0 oC?

**Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**10.** Given the following information determine how much heat energy involved as 25.0 mL of water is taken from 35.0 oC to – 6.5 oC?

**Thermal Constants of Water**

|  |  |
| --- | --- |
| Specific heat capacity of ice (J/goC) | 2.12 |
| Specific heat capacity of water (J/goC) | 4.19 |
| Specific heat capacity of water vapour (J/goC) | 2.00 |
| Heat of fusion of water (kJ/mol) | 6.01 |
| Heat of fusion of water (kJ/mol) | 40.8 |

**Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**11.** Determine the molar enthalpy for the following reaction using bond energies.

N2 (g) + 3 H2 (g) 🡪 2 NH3 (g)

**Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**